

**REMARKS**

Claims 1-19 are pending, with claims 1 and 12 being independent form. Claims 1 and 12 have been amended. Reconsideration and allowance of the present application are respectfully requested.

Claims 1-16 were rejected under 35 U.S.C 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims have been carefully reviewed and amended with particular attention to the points raised in the Office Action. Accordingly, withdrawal of the rejection under Section 112, second paragraph, is respectfully requested.

Claims 13-16 were rejected under 35 U.S.C. 102(b) as allegedly anticipated by GB 1,401,600 to Ejerer. Claims 1-16 are rejected under 35 U.S.C. 102(b) as allegedly anticipated by U.S. Patent 5,648,125 to Cane. Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits independent claims 1 and 13 are patentably distinct from the cited art, for at least the following reasons.

Independent claim 1 relates to a method for pretreating a surface of a non-conducting material to be plated by precipitation of a precipitation metal in the presence of a catalytic metal, **characterised by** a) depositing an adsorbing metal oxide on the surface, b) treating the surface including the adsorbing metal oxide with a solution of transition metal ions, and subsequently c) treating the surface with a solution of catalytic metal ions, where the adsorbing metal oxide absorbs the transition metal ions, the transition metal ions reduce the catalytic metal ions into catalytic metal, and the catalytic metal catalyzes a subsequent precipitation of the precipitation metal.

A salient feature of the present disclosure is that at least a portion of the deposit of adsorbing metal oxide (e.g., such as manganese dioxide) remains on the surface of the non-conducting material to be plated. For example, as recited in independent claim 1, an adsorbing metal oxide is deposited on the surface and the

surface including the adsorbing metal oxide is treated with a solution of transition metal ions.

The method as recited in claim 1 thus differs from usual methods as discussed in the background of the present disclosure. For example, see page 2, lines 5 - 9, of the published PCT text (WO 2004/029327). It is well known to etch the surface with potassium permanganate. However, the manganese dioxide formed by the reaction is normally removed before the next step as an unwanted and disturbing material. As will be further explained below both Ejerer and Cane teach to remove the manganese dioxide deposit.

For example, Ejerer , as understood by Applicant relates to a composition and process for the activation of resinous bodies for adherent metallization and teaches to etch a resinous surface in order to prepare the surface for an electroless metal deposit. The etching composition includes permanganate ions and manganate ions in a specified ratio (e.g., see claim 1 of Ejerer) and the pH is controlled preferably at about 12.5 (e.g., see claim 3 of Ejerer).

Manganese dioxide is mentioned in claim 10 but only as it relates to restoring of the etching composition. However, Ejerer is silent about a permanent coating of manganese dioxide on the treated (etched) substrate.

Example 1 described on page 4 of Ejerer discloses how the etching composition is to be used. The substrate is first cleaned and rinsed with water (step a). Then it is etched with a solution of  $\text{KMnO}_4$  (40 g in 1000 ml water adjusted to pH 12.5 with  $\text{KOH}$ ). At this stage, the generated manganese dioxide will form a layer on the substrate surface. Thereafter the substrate is first rinsed (step c) and neutralized with hydroxylamine.HCl and HCl (step d) and further it is treated with hydrochloric acid (step e). However, as understood by Applicant, by the treatment in steps (d) and (e) the layer of manganese dioxide is removed from the surface leaving the free etched substrate surface open for the further treatment with palladium chloride and stannous chloride in step (g).

According to an embodiment of the present disclosure, the manganese dioxide coating is allowed to remain on the substrate surface. To ensure this, treatment with hydroxylamine.HCl and/or HCl is avoided and the excess of potassium permanganate is removed with **pure** water (Example 1, page 14, lines 17 - 18, of the present disclosure). As recited in independent claim 1 an adsorbing metal oxide is deposited on the surface, the surface including the adsorbing metal oxide is treated with a solution of transition metal ions, and subsequently the surface is treated with a solution of catalytic metal ions.

Thus the article as recited in claims 13 - 16 do in fact still include a coating of manganese dioxide after the complete pretreating and the following plating process. This would not be the case if the substrate were treated as disclosed in the Ejerer patent.

Accordingly, Applicant submits claims 13-16 are patentably distinct from the Ejerer patent.

In a similar manner, Cane is also not understood to teach or suggest salient features of the present disclosure. For example, one main question is whether or not Cane teaches to maintain a layer of manganese dioxide on the substrate surface. The Office Action refers to column 16, lines 6 - 42, especially lines 25 - 27, which state

*"a manganese oxide coating on the surface of the non-conductive substrate which is attached thereto by covalent bonds".*

However, there is no evidence confirming this statement. In fact, it appears when starting from line 24 that the statement is mere speculation:

*"It is theorized that the treatment with a permanganate solution forms a manganese oxide coating on the surface of the non-conductive substrate which is attached thereto by covalent bonds".*

When the reader tries to distinguish between theorized speculations and well-founded information from the Cane document, he or she would normally believe more in the specific examples. Example 1 starting on column 28 of Cane discloses the treatment with an alkaline permanganate solution as step 1 (b). This step is followed by step 1 (c) teaching to *"remove any manganese deposits and copper oxides.....in a*

*bath containing 10% sulfuric acid and hydrogen peroxide at 100 °F in 3 minutes with agitation"*

These conflicting statements are in fact self-contradictory. As understood by Applicant, the term "any manganese deposits" would appear to include any possible manganese compound, such as the different oxides, permanganate etc., and thus also manganese dioxide.

Moreover, as only one of the statements can be true, it is believed that a person of ordinary skill in the art faced with the contradictory teachings in Cane would believe more in the concrete example than on the theorized assumption stated in the general description of Cane.

Furthermore, it is noted that according to claim 1 step a) in Cane the surface of the non-conductive substrate can also be prepared by plasma desmearing as an alternative to the treatment with alkaline permanganate. Such plasma desmearing would not leave any layer of manganese dioxide.

Accordingly, it appears that Cane had no intention to maintain the manganese dioxide on the surface.

As further evidence, reference can be made to The Merck Index (1996) index 5770 "Manganese Dioxide" (copy attached) disclosing:

*"in presence of hydrogen peroxide or oxalic acid it dissolves in dil  $H_2SO_4$  or  $HNO_3$ ".*

Thus Cane clearly teaches to remove manganese dioxide by using *"a bath containing 10% sulfuric acid and hydrogen peroxide at 100 °F in 3 minutes with agitation"* in Example 1, step 1 (c).

Accordingly, Applicant submits that Cane does not teach or suggest to provide a permanent coating of manganese dioxide on the non-conductive surface.

Applicant finds no teaching or suggestion in the cited art of a method for

pretreating a surface of a non-conducting material to be plated by precipitation of a precipitation metal in the presence of a catalytic metal, **characterised by** depositing an adsorbing metal oxide on the surface and treating the surface including the adsorbing metal oxide with a solution of transition metal ions, as recited in independent claim 1.

Applicant also finds no teaching or suggestion in the cited art of a method for pretreating a surface of a non-conducting material to be plated by precipitation of a precipitation metal in the presence of a catalytic metal, and to be subjected to a subsequent electrolytic plating or another type of surface treatment, **characterized by** depositing manganese dioxide ( $\text{MnO}_2$ ) or ochre ( $\text{Fe}_2\text{O}_3$ ) on the surface and treating the surface including the manganese dioxide or ochre with a solution of  $\text{Sn}^{++}$  ions or  $\text{Co}^{++}$  ions, as recited in independent claim 12.

Accordingly, Applicant submits independent claims 1 and 12 are patentably distinct from the cited art.

It is respectfully requested that the present Amendment be entered and the application be allowed to issue.

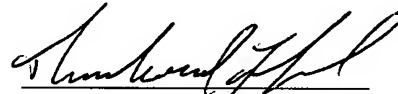
The Office is hereby authorized to charge any additional fees that may be required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a petition for an additional extension of time is required to make this response timely, this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Entry of this amendment and allowance of this application are respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Richard F. Jaworski', written over a horizontal line.

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# THE MERCK INDEX

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USE: Catalyst, antiknock additive.

**5768. Manganese Chloride.** Manganous chloride; manganese dichloride.  $\text{Cl}_2\text{Mn}$ ; mol wt 125.84. Cl 56.34%, Mn 43.66%.  $\text{MnCl}_2$ .

Tetrahydrate, reddish, slightly deliquescent, monoclinic crystals.  $d$  2.01. mp  $58^\circ$ . Sol in 0.7 part water; sol in alcohol. Insol in ether. pH of 0.2 molar aq soln 5.5. *Keep well closed.* LD s.c. in mice: 180-250 mg/kg; i.v. in dogs: 201.6 mg/kg, *Handbook of Toxicology*, Vol. 1, W. S. Spector, Ed. (Saunders, Philadelphia, 1956) pp 182-183.

USE: In dyeing (manganese bister); disinfecting; purifying natural gas; linseed oil drier; in electric batteries.

**5769. Manganese Difluoride.** Manganous fluoride; manganese fluoride.  $\text{F}_2\text{Mn}$ ; mol wt 92.93. F 40.89%, Mn 59.11%.  $\text{MnF}_2$ . Prep'd from manganese carbonate and hydrogen fluoride: Moissan, Venturi, *Compt. Rend.* **130**, 1158 (1900); Kwasnik in *Handbook of Preparative Inorganic Chemistry*, Vol. 1, G. Brauer, Ed. (Academic Press, New York, 2nd ed., 1963) pp 262-263.

Pink, quadratic prisms (tetragonal structure, rutile type) or reddish powder. *Poisonous!*  $d$  3.98. mp  $856^\circ$ . Soly in water (g/100 ml): 0.66 ( $40^\circ$ ); 0.44 ( $60^\circ$ ); 0.48 ( $100^\circ$ ). Insol in alc. Sol in dil hydrofluoric acid, conc'd hydrochloric or nitric acid. Lowest published lethal dose in guinea pigs: 200 mg/kg orally; 700 mg/kg s.c., *Toxic Substances List*, H. E. Christensen, Ed. (1973) p 574. Tetrahydrate, obtained by dissolving manganese carbonate in hydrofluoric acid, evaporating, and drying *in vacuo*.

**5770. Manganese Dioxide.** Manganese binoxide; manganese peroxide; manganese superoxide; black manganese oxide.  $\text{MnO}_2$ ; mol wt 86.94. Mn 63.19%, O 36.81%. Occurs in nature as the mineral *pyrolusite*, or made artificially (pptd). The native product is heavy, steel-gray when in lumps, black when powdered; the pptd product is a brownish-black, fine powder. Both usually contain some  $\text{Mn}_3\text{O}_4$  and some water. When ignited evolves oxygen, leaving  $\text{Mn}_3\text{O}_4$ . Lab prep'n: Moore *et al.*, *J. Am. Chem. Soc.* **72**, 856 (1950); Covington *et al.*, *Trans. Faraday Soc.* **58**, 1975 (1962). Review of use as reagent: J. S. Pizey, *Synthetic Reagents* vol. 2 (John Wiley, New York, 1974) pp 143-174.

Tetragonal crystals (rutile structure). Insol in water, nitric or cold sulfuric acid; slowly dissolves in cold HCl with evolution of  $\text{Cl}_2$ ; in presence of hydrogen peroxide or oxalic acid it dissolves in dil  $\text{H}_2\text{SO}_4$  or  $\text{HNO}_3$ . *Caution: Manganese dioxide is a strong oxidizer, hence it should not be heated or rubbed with organic matter or other oxidizable substances, e.g., sulfur, sulfides, phosphides, hypophosphites, etc.* LD i.v. in rabbits: 45 mg/kg, *Handbook of Toxicology*, Vol. 1, W. S. Spector, Ed. (Saunders, Philadelphia, 1956) pp 182-183.

USE: The mineral is the source of manganese and all its compds; largely used in manuf manganese steel; oxidizer; in alkaline batteries (dry cells); for making amethyst glass, decolorizing glass; painting on porcelain, faience and majolica. The ppt is used in electrotechnics, pigments, browning gun barrels, drier for paints and varnishes, printing and dyeing textiles.

**5771. Manganese Hypophosphite.**  $\text{H}_4\text{MnO}_4\text{P}_2$ ; mol wt 184.91. H 2.18%, Mn 29.71%, O 34.61%, P 33.50%.  $\text{Mn}(\text{H}_2\text{PO}_2)_2$ .

Monohydrate, pink, odorless, almost tasteless crystals or powder. When heated evolves spontaneously flammable phosphine. One gram dissolves in 6.5 ml water, 6 ml boiling water. Insol in alcohol.

exists in four stable below in the range face-centered 6.37;  $\delta$ -form,  $d_{1143}$  6.28.  $\gamma$ -tered tetrago- 115 cal/g/°C; hardness 5.0. urns with an ater slowly in manganese is y attacked by olution of hy- salts. Reacts onate. When rm a nitride. ride, by chlo- reduces most ; directly with

are are parkin- fusion; metal dyspnea, rales ting; malaise; nical Hazards

railway points ent of several e, Manganin.

mol wt 173.03. %.  $\text{Mn}(\text{CH}_3)_3$ -

clinic crystals. / in rats: 3.73 0, 470 (1969). drier for paints

$\text{H}_4\text{O}_7 \cdot 8\text{H}_2\text{O}$ . alcohol. Dec

for linseed oil,

ese dibromide. 8%.  $\text{MnBr}_2$ . crystals. mp  $64^\circ$  sol in alcohol. d.

mol wt 114.95. (Usually com- mineral rhodo-

shly pptd, but Rhombohedral, ohol. Sol in dil

drier for var-

rbonyldimanga-, Mn 28.17%, O on of  $\text{MnI}_2$  with rd *et al.*, *J. Am.* pns: Brimm et